

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Starnes et al.

Examiner:

Serial No:

Group Art Unit:

Filed:

Date: May 19, 2004

For: "ORGANIC THIOL METAL-FREE STABILIZERS AND PLASTICIZERS  
FOR HALOGEN-CONTAINING POLYMERS"

Commissioner for Patents  
Alexandria, VA 22313

INFORMATION DISCLOSURE STATEMENT

Sir,

This invention relates to aromatic and aliphatic organic thiol compounds which can be utilized to plasticize and/or stabilize halogen-containing polymer compositions, especially poly(vinyl chloride) compositions. Compounds of the present invention are utilized in polymers normally susceptible to deterioration and color change, which typically occurs during processing of the polymer or exposure to certain environments.

As authorized and encouraged under 37 C.F.R. §1.97 – 1.99, Applicant hereby cites as a means of complying with the duty of disclosure set for in 37 C.F. R. §1.56, the following patents and or documents, which the Examiner should consider with respect to the above-identified U.S. Patent Application.

US PATENT/DOCUMENT		
PATENT/DOCUMENT NO.	DATE	NAME
2,483,984	October 4, 1949	Searles, Jr.
3,136,740	June 8, 1964	Klemchuk, et al.
3,167,527	1/26/65	Hechenbleikner
3,242,133	March 1966	W. Lindsey
3,445,419	May 20, 1969	Vanderlinde
3,503,924	March 31, 1970	Pollock et al.
3,507,827	April 21, 1970	Pollock et al.

3,585,038	June 15, 1971	Cescon et al.
3,652,733	March 1972	N. Davenport
3,734,753	May 22, 1973	Greco et al.
3,875,109	April 1, 1975	Bridgland et al.
3,917,553	November 4, 1975	Thompson
3,928,285	December 23, 1975	Gough et al.
3,966,794	June 29, 1976	Larsen, Donald W.
3,979,359	September 1976	Kugele et al.
4,098,763	July 4, 1978	Starnes, Jr.
4,132,812	January 2, 1979	Eckart, Mathias
4,198,305	April 1980	A. Okorodudu
4,202,806	May 13, 1980	Yoshida et al.
4,264,482	April 28, 1981	Homan, Gary R.
4,333,987	June 8, 1982	Kwart et al.
4,338,226	July 6, 1982	Worschech et al.
4,412,897	November 1, 1983	Kornbaum et al.
4,576,984	March 18, 1986	Bresser et al.
4,616,046	October 7, 1986	Chenard Jean-Yves et al.
4,625,059	November 25, 1986	Shibano et al.
4,711,920	December 1987	Kugele et al.
4,849,463	July 18, 1989	Kemper
4,873,005	October 10, 1989	Hyde
4,948,827	August 14, 1990	Christidis
4,963,594	October 16, 1990	Gay
4,973,619	November 27, 1990	Kemper
5,006,436	April 1991	Hung et al.
5,030,671	July 9, 1991	Wehner et al.
5,057,567	October 15, 1991	Fisch et al.
5,057,622	October 15, 1991	Chisholm et al.
5,198,486	March 30, 1993	Chisolm et al.
5,216,058	June 1, 1993	Visneski
5,294,666	March 1994	Okada et al.
5,414,030	May 9, 1995	Kotani et al.
5,536,767	July 16, 1996	Beckman et al.
5,594,088	January 14, 1997	Nagata et al.
6,232,380	May 15, 2001	Conroy et al.
6,326,518	December 4, 2001	Duvall et al.
6,476,183	November 2002	Bakkeren et al.

FOREIGN DOCUMENTS		
EP 0 133 130	February 1985	Europe
EP 0 205 261	December 1986	Europe
EP 0 890 608 A2	January 13, 1999	Europe
EP 0 945 484 A1	September 29, 1999	Europe
632 47 736	July 1984	Germany
1,024,270	January 25, 1965	GB
JP 01090167 A	4/6/89	Japan
JP 54-53002	April 1979	Japan
JP 63-128002	May 1988	Japan
JP63241055	6/10/88	Japan
WO 99/09094	February 25, 1999	WIPO
ARTICLES		
Abstract from 36 Plastics Manufacturer, Volume 86, 1977 pp. 44-45 entitled "Stabilizers for Chlorine-Containing Resins".		
Stabilization of Poly(vinyl chloride) by Thiols. A Mechanistic Study, Volume 11, No. 2, W. H. Starnes, Jr., I. M. Plitz, D. C. Hische, D. J. Freed, F. C. Schilling, and M. L. Schilling, Bell Laboratories, Murray Hill, New Jersey, pp. 373-382, March-April 1978.		
An Alternative Synthesis of Tiopinac, T. Craig Thurber et al., Contribution Number 567, Development Research Laboratory, Institute of Organic Chemistry, July-August 1982, pp. 961-965.		
Thermal Stabilization of PVC by "Plasticizer Thiols", W. H. Starnes, Jr. et al., Departments of Chemistry and Applied Science, Journal of Vinyl & Additive Technology, December 2001, Volume 7, No. 4, pp. 250-253.		
Heat Stabilization and Plasticization by "Plasticizer Thiols", A Remarkable New Class of Nonmetallic Additives for PVC, W. H. Starnes et al., Departments of Chemistry and Applied Science, Polymer Preprints 2001.		
Nonmetallic Primary Heat Stabilizers for Poly(vinyl chloride), W. H. Starnes, Jr. et al., Department of Chemistry and Department of Applied Science, March 24-27, 2002, Additives 2002 Conference, pp. 1-7		
The conductive sulfur/carbon mixture cathode. An efficient synthesis of thiophenes and related compounds from acetylenes. Le Guilanton et al. Lab. Electrochim. Org., Univ. Cathol. Quest, Angers 49005, Fr. Tetrahedron Letters (1986) 27 (20) 2261-2		

A Novel Initiation Process for the Nonoxidative Thermal Dehydrochlorination of Poly(vinyl chloride): Apparent Intermediacy of a Cyclic Chloronium Ion by Starnes et al., Polymer Preprints (American Chemical Society, Division of Polymer Chemistry), 21 (2), pp.138-139, 1980.

Mechanistic Aspects of the Degradation and Stabilisation of Poly(vinyl chloride) by W. H. Starnes, Jr., Developments in Polymer Degradation - 3; N. Grassie, Ed.,; Applied Science: London, U.K., Chapter 5, pp.135-171, 1981.

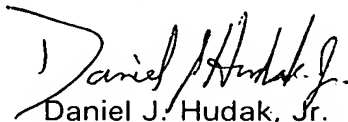
Primary Event in the Thermal Dehydrochlorination of Pristine Poly(vinyl chloride): Intermediacy of a Cyclic Chloronium Ion by Raghavachari, et al., Journal American Chemical Society, Volume 104, pp.5054-5056, 1982.

In accordance with 37 C.F.R. §1.98(a)(2)(i), no copies of the cited U. S. references are furnished. Copies of the foreign patent documents and articles are attached in accordance with 37 C.F.R. §1.98(a)(2).

An official action considering the enclosed items is earnestly solicited.

Respectfully submitted,

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Attorney Docket No.: EP 1020-CIP-CON

<b>Form PTO-1449</b> U.S. Department of Commerce Patent and Trademark Office  <b>LIST OF PRIOR ART CITED BY APPLICANT</b> (Use several sheets if necessary)				Atty. Docket No.:  EP 1020-CIP		Serial No.:	
				Applicant:  Starnes, et al.			
				Filing Date:			

U.S. PATENT DOCUMENTS							
*Examiner Initial		Document Number	Date	Name	Class	Subclass	Filing date if appropriate
	AA	2,483,984	October 4, 1949	Searles, Jr.			
	AB	3,136,740	June 8, 1964	Klemchuk, et al.			
	AC	3,167,527	1/26/65	Hechenbleikner			
	AD	3,242,133	March 1966	W. Lindsey			
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	AH	3,585,038	June 15, 1971	Cescon et al.			
	AI	3,652,733	March 1972	N. Davenport			

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	AL	EP 0 133 130	February 1985	Europe			
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OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)		
	AR	Abstract from 36 Plastics Manufacturer, Volume 86, 1977 pp. 44-45 entitled " <u>Stabilizers for Chlorine-Containing Resins</u> ".
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	AT	An Alternative Synthesis of Tiopinac, T. Craig Thurber et al., Contribution Number 567, Development Research Laboratory, Institute of Organic Chemistry, July-August 1982, pp. 961-965.

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	AL	EP 0 945 484 A1	September 29, 1999	Europe			
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	AR		The conductive sulfur/carbon mixture cathode. An efficient synthesis of thiophenes and related compounds from acetylenes. Le Guilanton et al. Lab. Electrochim. Org., Univ. Cathol. Quest, Angers 49005, Fr. Tetrahedron Letters (1986) 27 (20) 2261-2
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